

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1, 3, 5, 9-10 and 15 have been amended herein. New claims 28-51 have been added. Support for the newly added claims can be found throughout the specification. Claims 1-3 and 5-51 are now pending in this application.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1-3 and 5-26 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. The specification is objected to because of alleged informalities at pages 5-6. Claims 1-3, 5-7 and 11-21 (as they relate to specie III) and claims 23, 25 and 27 (as they relate to specie IV) stand rejected under 35 U.S.C. § 103 as allegedly being obvious over Scholze et al. (U.S. Patent No. 4,238,590). Applicants respectfully traverse these rejections.

Applicants acknowledge the Examiner's indication that claims 1-3, 5-8 and 11-20 (with respect to species I, II, VI and their combinations), claims 21-26 (with respect to species I, II and IV and combinations) and claims 3, 5-6, 8-10, 24 and 26 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112, second paragraph.

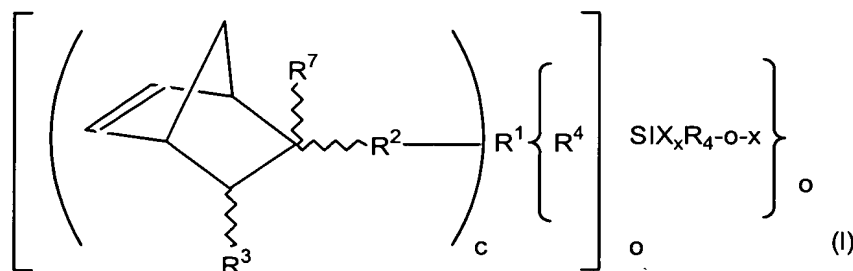
Claims 1-3 and 5-26 are definite

Claims 1-3 and 5-26 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Specifically, the Examiner objected to the multiplicity of the term "optionally". The claims have been amended herein to remove the term "optionally". New claims 28-30 have been presented which are directed to this subject matter. Withdrawal of this rejection is earnestly solicited.

The Specification is Proper

The specification is objected to because of alleged informalities at pages 5-6. Specifically, the Examiner objects to the specification for allegedly describing the groups R^5 , R^6 and R^7 which the Examiner alleges are not part of the compound of formula I.

As can be seen from the specification at page 5, the compound of formula I is as follows:



The compound of formula I includes the group R^7 as a substituent on the norbornene group on the left hand side of the molecule. The specification also describes that R^4 may be, for example, $(\text{CHR}^6-\text{CHR}^6)_n$, $\text{CHR}^6-\text{CHR}^6-\text{S}-\text{R}^5$ -, $-\text{CO}-\text{S}-\text{R}^5$ -, $\text{CHR}^5-\text{CHR}^6-\text{NR}^6-\text{R}^5$ -, $-\text{Y}-\text{CS}-\text{NH}-\text{R}^5$ -, $-\text{S}-\text{R}^5$ -, $-\text{Y}-\text{CO}-\text{NH}-\text{R}^5$ -, $-\text{CO}-\text{O}-\text{R}^5$ -, $-\text{Y}-\text{CO}-\text{C}_2\text{H}_3(\text{COOH})-\text{R}^5$ -, $-\text{Y}-\text{CO}-\text{C}_2\text{H}_3(\text{OH})-\text{R}^5$ - or $-\text{CO}-\text{NR}^6-\text{R}^5$. Thus, the groups R^5 and R^6 are properly defined in the specification as they may be part of the R^4 group present in the compound. For at least these reasons, it is submitted that the specification is proper and that the objection be withdrawn.

The Pending Claims are Patentable Over Scholze

Claims 1-3, 5-7 and 11-21 (as they relate to specie III) and claims 23, 25 and 27 (as they relate to specie IV) stand rejected under 35 U.S.C. § 103 over Scholze et al. (hereinafter "Scholze"). Applicants respectfully traverse these rejections.

The present invention, as set forth in claim 1, relates to the preparation of a semipermeable membrane by hydrolytic polycondensation of a material comprising at least one compound having formula I, II, III and IV (or precondensates thereof). The liquid or resin obtained therewith "represents a polycondensate of hydrolytically condensed silicon

compounds of the formula I and/or II and/or III and/or IV” (See page 11, lines 19 to 21 of the instant specification). It would have been clear to the person having ordinary skill in the art from the instant specification that hydrolysis of any of compounds I to IV will result in the removal of group X which is present in each of the compounds and that the subsequent condensation will result in the formation of a Si-O-Si-O... backbone or framework. Step (c) of claim 1 recites that the membrane is cured by forming an organic network using a process selected from the group consisting of thermal curing, radiation-induced curing and chemically induced curing.

Scholze does not disclose or suggest the use of functional silane compounds which are able to undergo organic polymerization as set forth in the instant claims. In the Office Action, the Examiner posits that Scholtze’s recitation of diphenyldichlorosilane as a “suitable starting silanes” renders the claimed method with respect to compounds of the formula III obvious and that the recitation of substituted silanes of the formula II in Scholze render the claimed method with respect to compounds of the formula IV obvious. For the reasons set forth below, it is respectfully submitted that the Examiner is in error.

As outlined above, claim 1 recites a method for the “formation of an organic network using a process selected from the group consisting of thermal curing, radiation-induced curing and chemically induced curing”. Thus, the claimed method recites the formation of an organic network (or framework) within the polymeric material which had already been obtained by hydrolytic condensation of the inorganic parts (*i.e.* Si-O-Si...).

Step (c) of claim 1 describes something that is not “equivalent” but rather “different” from the hydrolytic condensation of step (a), namely polymerization of organic parts of the material obtained by hydrolytic condensation. All four compounds of formula I to IV contain groups which can participate within such a reaction and are sensitive to thermal, radiation-induced and/or chemically-induced organic polymerization: compounds of formula I contain a norbornene group having a C=C group and being under ring tension, while the compounds of formulae II and III contain a group B which is a straight-chain or branched organic radical having at least one C=C double bond, and the compounds of formula IV contain a group which is an organic radical having 1 to 5 mercapto groups.

While it is clear that the hydrolytically condensed material derived from compounds of formula I to III can be cured by thermal curing, radiation-induced curing and/or chemically-induced curing without a reaction partner, it is necessary to provide the presence of additives which are addition-copolymerizable and/or can be subjected to an addition and/or polyaddition reaction if the hydrolytically condensed material to be cured according to step (c) is merely derived from compounds of formula IV since mercapto groups need such additives in order to provide a curing of the organic network (so called thiol-ene-reaction).

Scholze discloses diphenyldichlorosilane as a "suitable starting silanes" and substituted silanes of the formula II (in Scholze). The Examiner is of the opinion that these formulae are comparable to formulae III and IV, respectively, of the present invention. Formula III of the present invention, however, contains a group B having at least one, and in specific cases at least two, C=C double bonds which is able to undergo organic curing reactions thereby forming an organic network. Scholze does not disclose or suggest the group B in any of their formulae I to III. The Examiner takes the position that diphenyldichlorosilane meets the limitation of the group B as claimed in present claim 1, apparently based on the assumption that diphenyldichlorosilane would contain the claimed double bonds. Although phenyl groups are sometimes written as having three C=C double bonds, it is known to every chemist that in fact, benzene is no cyclohexatriene, but that the electrons are equally distributed in two ring structures delocalized above and below the C-ring plane and therefore have different properties, compared to what a chemist understands under a C=C double bond. Although it is not impossible that phenyl rings undergo organic polymerization reactions, such reactions are typically very slow and typically cannot be observed without any additional measures. In any event, such measures are not disclosed or suggested by Scholze.

Furthermore, Scholze does not disclose or suggest organic curing. Scholze does not teach or suggest forming an organic network by subjecting the claimed compounds to an organic curing. Scholze is completely silent regarding curing step which would provide an organic network within the hydrolytically condensed material.

In contrast, present claim 1 requires that curing step (c) is performed as thermal curing, radiation-induced curing or chemically induced curing. Furthermore, the specification

at page 23, first full paragraph states that the presence of silicon compounds having C=C groups (i.e. compounds of formula (III)) results in that the said compounds are incorporated in the organic network of the membranes in the course of the addition polymerization and/or (poly) addition. Further, the next paragraph of the specification states that specific additives may be necessary in specific cases, for example curing catalysts for the case that curing is induced chemically.

It is well known to a skilled person that C=C double bonds are polymerized in a radically induced polymerization reaction, in general requiring irradiation with light. Consequently, a skilled person derives from claim 1 that when compounds of formula III are used in the method according to claim 1, curing according to step (c) must be radiation-induced. In accordance with this, examples 1, 2 and 4 in the present specification, which are directed to the use of compounds falling under formula (III) (acrylates or methacrylates), describe the addition of a photoinitiator (examples 1 and 2) or irradiation (film production according to example 4).

Thus, Scholze does not disclose or suggest the instantly claimed method with respect to species III. Therefore, claims 1-3, 5-7 and 11-21 (as they relate to specie III) are patentable over Scholze.

Regarding formula (IV), while Scholze discloses mercapto group containing silanes, mercapto groups containing compounds alone are not capable of undergoing a curing step by which an organic network is formed. Only the presence of an additive as defined in step (c) will result in a curable liquid. For example, in the presence of a compound comprising a C=C double bond, the mercapto groups of a silane of formula IV will react with this double bond in a so called thiol-ene-reaction. By this reaction, a linkage between two silanes formerly containing the said mercapto group is formed, and consequently, the network is built up.

Thus, the phrase "if necessary in the presence of additives which are addition-copolymerizable and/or can be subjected to an addition and/or polyaddition reaction" is in fact a necessary feature in case silanes of formula (IV), containing mercapto groups, are the solely used silanes of the liquid of claim 1.

Scholze does not teach that such a reaction partner could be present in case mercapto groups containing silanes are used. Therefore, Scholze does not disclose or suggest the use of compounds having formula (IV) together with an additive which is addition-copolymerizable and/or can be subjected to an addition and/or polyaddition reaction for providing a liquid which is formed to a membrane and then is cured under forming an organic network.

In short, claim 1 of the present invention recites that additives must be present where they are required to obtain an organic network by a curing reaction. Since mercapto groups cannot undergo organic curing when used alone, additives are necessary if a compound of formula IV is used as the only compound of the material of claim 1. Such an additive, however, is not disclosed nor suggested in Scholze. Thus, Scholze does not disclose or suggest the instantly claimed method with respect to species IV. Therefore, claims 23, 25 and 27 (as they relate to specie IV) are patentable over Scholze. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of this rejection under §103.

If an independent claim is nonobvious under §103, it is well-settled any dependency claim likewise is nonobvious. *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988). See MPEP 2143.03. Thus, Applicants submit that claims 2-3 and 5-27, which ultimately depend from claim 1, are also non-obvious.

Newly Added Claims 28-51

Applicants have added claims 28-51 which ultimately depend from claim 1. Applicants submit that claims 28-51 are nonobvious for the same reasons as claim 1 and, further, because none of the references, taken either individually or in combination teach or fairly suggest the claimed subject matter set forth in these claims.

Conclusion

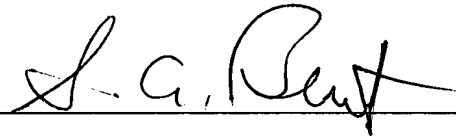
Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By _____

FOLEY & LARDNER LLP
Customer Number: 22428
Washington Harbour
3000 K Street, N.W., Suite 500
Washington, D.C. 20007-5143
Telephone: (202) 672-5300
Facsimile: (202) 672-5399

Stephen A. Bent
Registration No. 29,768
James M. Silbermann
Registration No. 40,413
Attorneys for Applicants